AMENDMENTS TO THE SPECIFICATION

Replace the paragraph beginning on page 1, line 12 and ending on page 1, line 15 with the following amended paragraph:

~~Multi-effect distillation (MED) process has been used in industry for juice evaporation, to concentrate a substance, production of salts and and for salty and marine water distillation for fresh water production.~~ Different processes have been used worldwide for desalination, for fresh water production. Major processes commercially available are membranes (reverse osmosis and electrodialysis) and thermal. Distillation is a thermal process that can be divided in three different methods: multi-stage flash distillation (MFD); multi-effect distillation (MED) and vapour compression. These processes can be used also to concentrate a substance as the object purpose.

Replace the paragraph beginning on page 1, line 16, with the following amended paragraphs:

~~In the MED process~~ In distillation processes, only a portion of the concentrate submitted to the heat transfer surfaces is evaporated. Each effect works in a ~~different pressure~~ specific equilibrium vapour-pressure state. The remaining liquid of each effect, normally called brine, ~~is fed to the liquid tray of the next effect or~~ is the entrance feed to the next stage, where part of it flashes into vapour.

In the MED process, ~~Produced~~ produced vapour in one effect will give up heat to boil the liquid transferred to the next effect due to the temperature difference between them, and several constructive models have been based on the type of evaporators used and on the creative design and arrangement distinctly disclosed in many patents worldwide.

Replace the paragraph beginning on page 1, line 24 with the following amended paragraph:

Sometimes ~~Normally~~ the effects or stages have evaporators located in separate ~~chambers~~ vessels, having the disadvantages of requiring a pipeline for conducting vapour from one stage to the next, and the necessity for more room, as shown in the US Patent numbers 3884767, 3261766 [[e]] and 3021265. When these stages are assembled in only one vessel, the construction can have the stages arranged in multi stack vertical falling film evaporators as disclosed in the US Patent numbers 4334954, 6089312, 6309513 and 3487873, all involving falling film type evaporators. Comment must be made to the Sephton (6309513) patent that is not a multi-effect apparatus but a parallel stack of evaporators.

Insert the following two new paragraphs after page 1, line 27:

Vertical Tube Evaporators (VTE) have basically two different evaporation systems: falling film and rising film evaporation. As widely described in technical literature, falling film evaporators have high heat transfer coefficients, but the proper design of the liquid distribution system is critical to achieve full and even product wetting of the tubes, with higher risk of having so-called dry spots or film breakdown or vapour blanket, that causes a lowering of heat transfer and is the cause of plugging by scale.

Vapour compression process has the great advantage of a low energy consumption and a high energy efficiency, but has the disadvantage of higher maintenance costs associated with down-time operations per the rotary equipment involved, as the compressor and respective driver, and sometimes the whole evaporator as disclosed in the single stage apparatus of US Patent number 6695951. The apparatus related to the US Patent number 4082616 is completely obsolete now due to these problems, besides higher scaling occurrences due to the high operational temperature.

Replace the paragraph beginning on page 1, line 29 and ending on page 2, line 10 with the following amended paragraphs:

Intended to improve the performance and reduce the height dimensions of such distillers, ~~this kind of equipment,~~ the present invention [[is]] was developed ~~assembling~~ using rising film evaporators, in a multi-effect apparatus. The solution to have a compact vessel containing the whole stages, without having a vertical stack, was to assemble the several evaporators in a concentric disposition, using a shell and tube exchanger for the first stage and a bundle of tubes for the succeeding stages, which are inserted one inside each other, on a horizontal base. If not developed on this disposition, this apparatus will need a pump to push sea water to the higher stages, and necessarily will have its dimensions increased upwardly and no reduction in height would be accomplished.

The advantages of using rising film evaporators are listed below:

a- Less tendency for scaling formation on the interior of evaporator tubes due to the uniform and even distribution of the solution on the bottom of apparatus in an ascending stream with tubes fill-up, dispensing devices as sparger holes and plates for distribution of entrance fluids, as mentioned per Biar et al. (6089312) and Sephton (6309513);

b- High degree of turbulence in the interior of tubes that is advantageous during evaporation of fluids that have a tendency to scale the heating surfaces;

c- High heat transfer coefficients as per the high turbulence.

Through this constructive arrangement, the following advantages are achieved:

d- material reduction due to the absence of vapour pipelines;

e- vapour friction losses reduced to a minimum;

f- smaller size due to the compactness of the concentric disposition of evaporators;

g- no heat loss to exterior in the inner stages;

h- cost effectiveness and higher performance due to the less vulnerability for scale tendency due to the rising film evaporators in all stages.

Delete the paragraph beginning on page 2, line 13, as follows:

~~Fresh water makers are extensively used in oil offshore platforms and ships, normally using the heat of the exhaust gases of thermal machines.~~

Replace the paragraph beginning on page 2, line 26 with the following amended paragraph:

The dimensions of a two stage 60 m3/d distiller ~~desalinator~~ have approximately 2.2 m height and 1.2 m in diameter.

Replace the paragraph beginning on page 4, line 11 with the following amended paragraph:

The following description refers ~~is refereed~~ to figures 1 to 9, all related to the two stage model, ~~whose~~ the operational philosophy of which extends ~~is extensive~~ to the other models.

Replace the paragraph beginning on page 4, line 14 with the following amended paragraph:

Figure 1 shows the two stage model with its evaporators assembled in the concentric arrangement where is observed that the second stage (Fig. 5) is assembled inside the first stage (Fig. 3), supported and bolted at the flange 1 (Fig 3). A gasket is used to avoid leakage. The upper chamber (Fig. 7) with the condenser 2 ~~inserted into it~~ inside, is assembled bolted in the same flange 1.

Replace the paragraph beginning on page 4, line 21 with the following amended paragraph:

On figures 2 and 3, is observed that the first stage is constituted of a shell and tube exchanger without part of the central tubes, here called Ring Shell and Tube

Evaporator. The inner wall 3 and the exterior wall 51 enclose ~~encloses~~ the hot water throughout the interior of the shell, returning for heating on outlet 5.

Replace the paragraph beginning on page 4, line 27 with the following amended paragraph:

Salt water feeds the first stage on nozzle 6, passing throughout the chamber 7, ~~and directs~~ constituted by the extension of the external wall 3, limited on bottom by flange 52 and on top by tubesheet 53. Feed is directed to the first stage tubes 8, receiving enough heat from hot water 4, until boiling. Heat is furnished so that only part of the water is vaporised in order to avoid excessive scales into the tubes. It is observed on figure [[2]] 3 that the vapour chamber 9 above the evaporator is enlarged in order to permit the passage of the vapour ~~to the condensation chamber 9~~ (Fig 3). Chamber 9 is limited on lateral by cylindrical shell 54, on top by flange 1 and the tubesheet of second stage, and on bottom by the base 53.

Replace the paragraph beginning on page 5, line 17 with the following amended paragraph:

Boiling water and vapour rises into the tubes 8, splashing on the plate 14 (Fig. 3). Vapour flows to the second stage evaporator tubes 15 (Fig 1 and 5), here named Cylindrical Bundle Evaporator. Touching the tube walls, the vapour condenses, giving up energy to boil the second stage salt water. The condensate produced is collected on the bottom of the chamber 9 (Fig. 3) and pumped to a storage tank through the outlet 16, delivering sensible heat to the incoming salt water 6 through the ~~bundle~~ coil 17, inside chamber 7.

Replace the paragraph beginning on page 5, line 27 with the following amended paragraph:

Second stage is fed by the remaining not vaporised first stage salt water, suctioned by the second stage lower pressure through tube 18, pouring into the tray 19, and flashing vapour. Tube 18 collects salt water from the bottom of an extended pipe, in order to keep an adequate water column, to avoid suction of vapour from the first stage. On the tray, water directs to the central tube 20, dropping to floating head 21, feeding second stage tube bundle 15. Central tube 20 has also the function to force a circulation of liquids to all tubes of the evaporator. Tray 19 and plate 14 prevent rising salt water droplets to reach the demisters 22 (first stage) and 23 (second stage). Both plate 14 and [[as]] tray 19 are removable in order to permit access to the tube sheets.

Replace the paragraph beginning on page 7, line 28 with the following amended paragraph:

Ring Evaporator Bundle has also an armour 46 (Fig. 13), in order to direct the first stage vapour to its bundle 47. Floating head 48 has on this way a ring format also, as shown on figure 14 (bottom view) and figure 15 (section view). An internal shell 49 and an external shell 50 enclose ~~encloses~~ and isolate the vapour inside this stage.

Insert the following new paragraph on page 8, between lines 6 and 7:

A one stage desalinator can be assembled by just inserting the condenser 2 inside vapour chamber 9.

Please admit the new abstract submitted herewith on a separate sheet.